

Work Order ID 78675

78675

Page 1

January-12-12 10:53:55 AM

Item ID: D206-667-101

Revision ID:

Item Name: Crosstube Fwd

Start Date: 12/01/2012 Start Qty: 1.00

Required Date: 10/02/2012 Req'd Qty: 1.00

Reference:



Accept

N900040100

Setup Start ***NS1***

Stop ***NS2***

Cust Item ID:

Customer:

Approvals: Process Plan: M.L.J Date: 12/01/12 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D206-667-141	Rev C (DEO)
DSI9565	A

100

100

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D206-667-101 CHG004

0.00

0.00

110

110

Packaging

Packaging

Packaging

Memo

0.00

0.00

Handwritten: 12-02-02 (1)
for M.L.J 12-2-1

Handwritten: 12-1-16

W/O: 78675		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206667-101 PAR #: _____ Fault Category: X-tube NCR: Yes ☒ No ☐ DQA: dot Date: 12/2/3
 Resolution: we are in Disposition: we are in QA: N/C Closed: ok Date: 12/3/2

NCR: 17-1173		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.02.01	110	Crushing at end of bend is $\approx 7\%$	<p>CP</p> <p>12.02.01</p> <p>CS/042</p>	Acceptable based on attached SR	<p>1/14</p>	<p>S</p> <p>12/02/02</p>	<p>CP</p> <p>12.02.01</p> <p>CS/042</p>	<p>S</p> <p>12/2/02</p>

NOTE: Date & initial all entries

Work Order ID 78675***78675***

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January-12-12 10:53:55 AM

Item ID: D206-667-101

Accept

N900040100Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Fwd

Stop ***NS2***

Start Date: 12/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

120

0.00

120

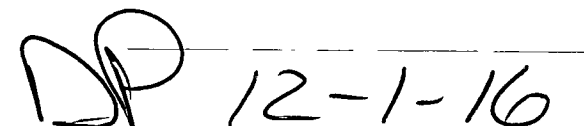
BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

Bend tube as per Dwg D206-667-141 using CNC bender program 206B-fw and
Folio FT _____

130

QC15- Crosstube Dimensional Check

0.00

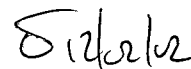
130

QC

Memo

0.00

Quality Control



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Work Order ID 78675***78675***

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January-12-12 10:53:55 AM

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N900040100Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Fwd

Stop ***NS2***

Start Date: 12/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Crosstubes	0.00							
140									
Crosstubes									
Crosstubes									
	Memo	0.00							
	1-Drill holes & ream using drill Jig DT8541 & DT8542 as per Dwg D206-667-141. Drill all (3) top holes.								
	3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.								
	4-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg D206-667-141. Drill only the top (2) holes.								
	5-Drill pilot holes as per Dwg D206-667-141. Drill only the top (2) holes.								
	6-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-141. Note: Fwd side has 3x top holes.								
	7-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D206-667-141.								
	8-C'sink holes as per Dwg D206-667-141. Allow rivet to sit below surface to compensate for paint.								
	9-Scribe part # and batch # using vibrating stylus as per Dwg D206-667-141 Inside of Cuff (Do not engrave on outside of tube)								
	10-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D206-667-141								



12-1-17



12-1-17

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Revision ID:

Item Name: Crosstube Fwd

Stop ***NS2***

Start Date: 12/01/2012 Start Qty: 1.00

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Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Crosstubes Chemical Conversion	0.00							
150									
HandFXtube	Memo	0.00		MO			12/1/12		
Hand Finishing Crosstubes									
160	QC3- Inspect Part Finish	0.00							
160									
QC	Memo	0.00		5.26.01					
Quality Control									
170	QC5- Inspect part completeness to step on W/O	0.00							
170									
QC	Memo	0.00		8.12.01					
Quality Control									

POSITIVE RECALL

EFFECTIVE 12.01.12 AUTH JP

RELEASED 12.02.01 DATE JP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

78675

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N900040100

Setup Start *NS1*

Stop *NS2*

*** 1 ***

Cust Item ID:

*** 1 ***

Customer:

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Run	Start	*NR1*
	Stop	*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Outsource process - NDT per QSI038 4.1

0.00

180

Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038Or
Issue P/O: 15924 LPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

190

0.00

190

Packaging

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

200

QC5- Inspect part completeness to step on W/O

0.00

200

QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
210									
SprayPaint									
Spray Painting									
	Memo	0.00							
	1-Prime inside and outside crosstube as per QSI 005 4.2.1 *****Let tube sit up right for 30mins before hanging*****								
	P4500-P-23 Base Batch: 117319 120133								
	P4500-C-23 Catalyst Batch: 117319 117319								
	Start time: 7:00 Finish: 8:30								
				1/18	12-01-19				
230	SprayPaint	0.00							
230									
SprayPaint									
Spray Painting									
	Memo	0.00							
	1-Paint outside crosstube with White Imron as per QSI 005 4.2								
	Imron 55U white paint Batch: 120063								
	Imron 125S activator Batch: 119947								
	Start: 11:30								
				1/18	12-01-19				

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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1

Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	QC14- Inspect Spray Paint	0.00							
240									
QC	Memo	0.00							
Quality Control									
250		0.00							
250	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DSI9565 and QSI 015 A/R Proseal 890 Batch: <u>120072</u>								
	3- Torque bolts as per dwg								
	3-Install nut plates as per Dwg D206-667-141. Touch-up rivet heads with Imron paint.								

AP 12-1-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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January-12-12 10:53:55 AM

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Stop ***NS2***

Item Name: Crosstube Fwd

Start Date: 12/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
260	QC5- Inspect part completeness to step on W/O	0.00							
260									
QC	Memo	0.00							
Quality Control									
270	Pick Kit	0.00							
270									
Packaging	Memo	0.00							
Packaging									
280	QC4- 100% Inspect kits for completeness	0.00							
280									
QC	Memo	0.00							
Quality Control									

Handwritten signature and date 12-01-31

Handwritten signature and date 12-1-31

Handwritten signature and date 12-02-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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NOTE: Date & initial all entries

Work Order ID 78675***78675***

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January-12-12 10:53:55 AM

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Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Crosstube Fwd

Start Date: 12/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 10/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
290	Packaging	0.00							
290									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D206-667-101								
	Location: _____								
	PPP Rev: _____								
300	QC21- Final Inspection - Work Order Release	0.00							
300									
QC	Memo	0.00							
Quality Control									

me
12-02-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

January-12-12 10:53:58 AM

Page 1

Work Order ID: 78675

78675

Parent Item: D206-667-101

D206-667-101

Parent Item Name: Crosstube Fwd

Start Date: 12/01/2012

Required Date: 10/02/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:F05.09.01Add holes for compatibility with Bell SkidtubesKJ/JLM
 IPP Rev:G 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec
 IPP Rev:H 08-07-28 update as per (par 08-013) DD verified by:EC
 IPP Rev J 09.01.06 Per ECN 08-562 EC verified by:DD IPP REV:K
 11.08.05 PER ECN 11-615 DD VERF:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D2873-043

Manufactured

No

250

Each

34.0000

2

2

D2873-043

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

34

72644

2

73605

12

75010

20

2

As 12-1-25

D2873-045

Manufactured

No

250

Each

27.0000

2

2

D2873-045

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG052

27

73529

7

74985

20

2

As 12-1-25

D2891-1

Manufactured

No

250

Each

40.0000

2

2

D2891-1

2.25 Support

Location

Loc Qty

Loc Code

LG052

40

72822

20

75176

20

2

As 12-1-25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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78675

D206-667-101

Start Date: 12/01/2012

Required Date: 10/02/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-395

Manufactured No

250

Each

98.0000

4

4

D3595-063-395

RUBBER CUSHION

Location

Loc Qty

Loc Code

MAT052

98

70975

21

74300

77

4

AS 12-1-25

MS20601-AD4W8

Purchased

No

250

Each

321.0000

14

14

MS20601-AD4W8

RIVET

Location

Loc Qty

Loc Code

LG

100

108521

100

LG051

121

117106

7

117381

3

117979

3

118572

8

119107

100

ST322

100

118454

100

14

AS 12-1-25

AN5-30A

Purchased

No

270

Each

62.0000

4

4

AN5-30A

BOLT

12/1/25

Location

Loc Qty

Loc Code

ST339

62

117514

9

118451

3

118706

50

4

January-12-12 10:53:58 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Parent Item: D206-667-101

D206-667-101

Parent Item Name: Crosstube Fwd

Start Date: 12/01/2012

Required Date: 10/02/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased

No

270

Each

215.0000

4

4

AN5-32A

Bolt

**

Location

Loc Qty

Loc Code

ST339

215

118422

2

118628

38

118983

25

119328

100

119862

50

AN5-7A

Purchased

No

270

Each

2,821.000

10

10

AN5-7A

Bolt

**

Location

Loc Qty

Loc Code

ST337

2821

117313

6

118422

1

119017

2814

AN960JD516

NAS1149D0563J

Purchased

No

270

Each

0.0000

18

18

AN960JD516

Washer

**

MS21042L5

Purchased

No

270

Each

2,022.000

4

4

MS21042L5

Nut

**

Location

Loc Qty

Loc Code

ST300

2022

116105

5

116548

43

117611

50

118179

424

119109

1500

January-12-12 10:53:58 AM

Shop Packet Print

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Parent Item Name: Crosstube Fwd

Start Date: 12/01/2012

Required Date: 10/02/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-20

Purchased

No

270

Each

60.0000

4

4

MS21920-20

Clamp (per MIL-DTL-8783C)

**

Location

Loc Qty

Loc Code

LG050

60

116799

10

119386

50

D206-667-101TRN

Manufactured

No

110

Each

2.0000

1

1

D206-667-101TRN

Crosstube Turning Detail

**

Ag 12-1-25

Location

Loc Qty

Loc Code

LG

2

50518

50519

1

1

12-1-16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

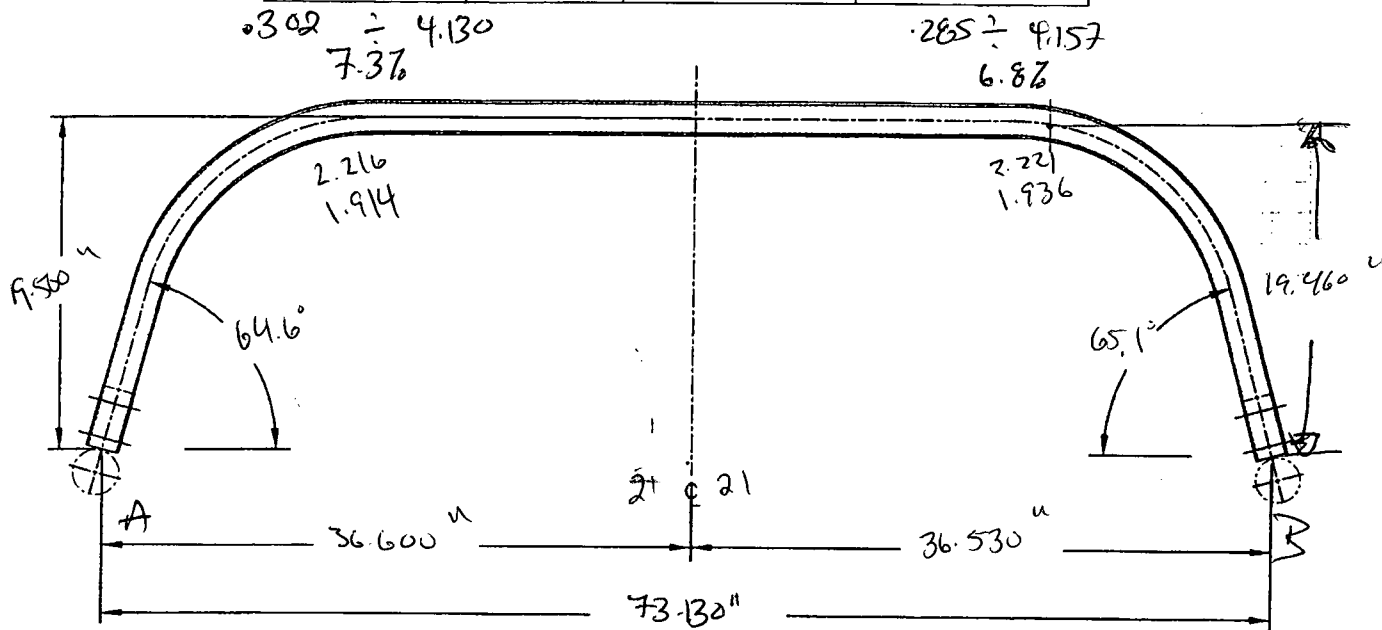
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	78675
Description: Crosstube High Fwd (206B)		Part Number:	D206-667-101
Inspection Dwg: D206-667-141	Rev: C	Page 1 of 1	

Required Dimension	Min	Max
Height	19.41	19.67
1/2 Span	36.47	36.73
Angle	65	67
Total Span	72.94	73.46



Comments
Sine A = 7.3% crush @ 21 Passes
Sine B = 6.8% crush @ 21 Passes
Acceptable @ 12.02.01 DSJ/AL

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.07.30	Dimensions revised per Dwg Rev C	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -141	Part Number	Description
1	X	D206-667-141	CROSSTUBE ASSEMBLY (206B HIGH FWD)
2	1	D8001-105	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6001-105
FINISHED LENGTH = 93.18±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 11.3 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

STANDARD
SUBMIT TO
WORK ORDER
NO. 78675 M.C.J.
12/01/12

DEO ATTACHED

OCN#11-615
11.07.26

UNDER REVIEW

RELEASED
08/11/12

C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C4-3, C5-3 & D3-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	00.11.17
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. C
CHECKED	RF	D206-667-141	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE ASS'Y (206B HIGH FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Technical drawing of a Crosstube Assembly (206B High FWD). The drawing includes a main perspective view of the assembly, which is a curved tube with various components attached. Key components labeled include: D2891-1 SUPPORT (2 PL), MS21920-20 CLAMP (4 PL), D3595-063-395 RUBBER CUSHION (4 PL, UNDER CLAMP), D206-667-501, D2873-043 NUT PLATE, MS20601AD4W8 RIVET (4 PL), MS20601AD4W8 RIVET (3 PL), and D2873-045 NUT PLATE. The drawing also shows two detailed views: VIEW A-A: CUFF DETAIL (SCALE 4X) and VIEW C-C: CUFF DETAIL (SCALE 4X). A section view, SECTION B-B (SCALE 5X), is also provided. The drawing is marked with various callouts and dimensions, including 13.08, 9°, and 90° REF. The drawing is dated 08.11.06 and is identified as D206-667-141. The drawing is marked with 'UNDER REVIEW' and 'RELEASED' stamps. The drawing is also marked with 'DEO ATTACHED'.

12 D2891-1 SUPPORT
2 PL

15 MS21920-20 CLAMP
4 PL

D3595-063-395
RUBBER CUSHION
4 PL, (UNDER CLAMP)

13

D206-667-501

D2873-043
NUT PLATE

MS20601AD4W8
RIVET, 4 PL

D2873-045
NUT PLATE

MS20601AD4W8
RIVET, 3 PL

90° REF

C6-2 **VIEW A-A: CUFF DETAIL**
SCALE 4X

13 15

MS21920-20 CLAMP REF

12 D2891-1 SUPPORT REF

D3595-063-395
RUBBER CUSHION
REF

C

D5-2 **SECTION B-B**
SCALE 5X

13.08

9°

90° REF

C3-2 **VIEW C-C: CUFF DETAIL**
SCALE 4X

DESIGN *JP*

DRAWN *RF*

CHECKED *JP*

MFG. APPR. *JP*

APPROVED *JP*

DE APPR. *JP*

DATE 08.11.06

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D206-667-141

TITLE CROSSTUBE ASS'Y (206B HIGH FWD)

SCALE NTS

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REV. C
SHEET 2 OF 4

baw #11-615
 11.07.28
 UNDER REVIEW
 11/26/13
 RELEASED
 08/11/12 JWP

DEO ATTACHED

DESIGN	<i>JP</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>JP</i>	DRAWING NO.	REV. C
MFG. APPR.	<i>JP</i>	D206-667-141	SHEET 2 OF 4
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE ASSY (206B HIGH FWD)	NTS
DATE	08.11.06	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD. IT IS NOT TO BE USED FOR OR REPRODUCED OR COMMERCIALIZED FOR ANY OTHER PERSON WITHOUT THE WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

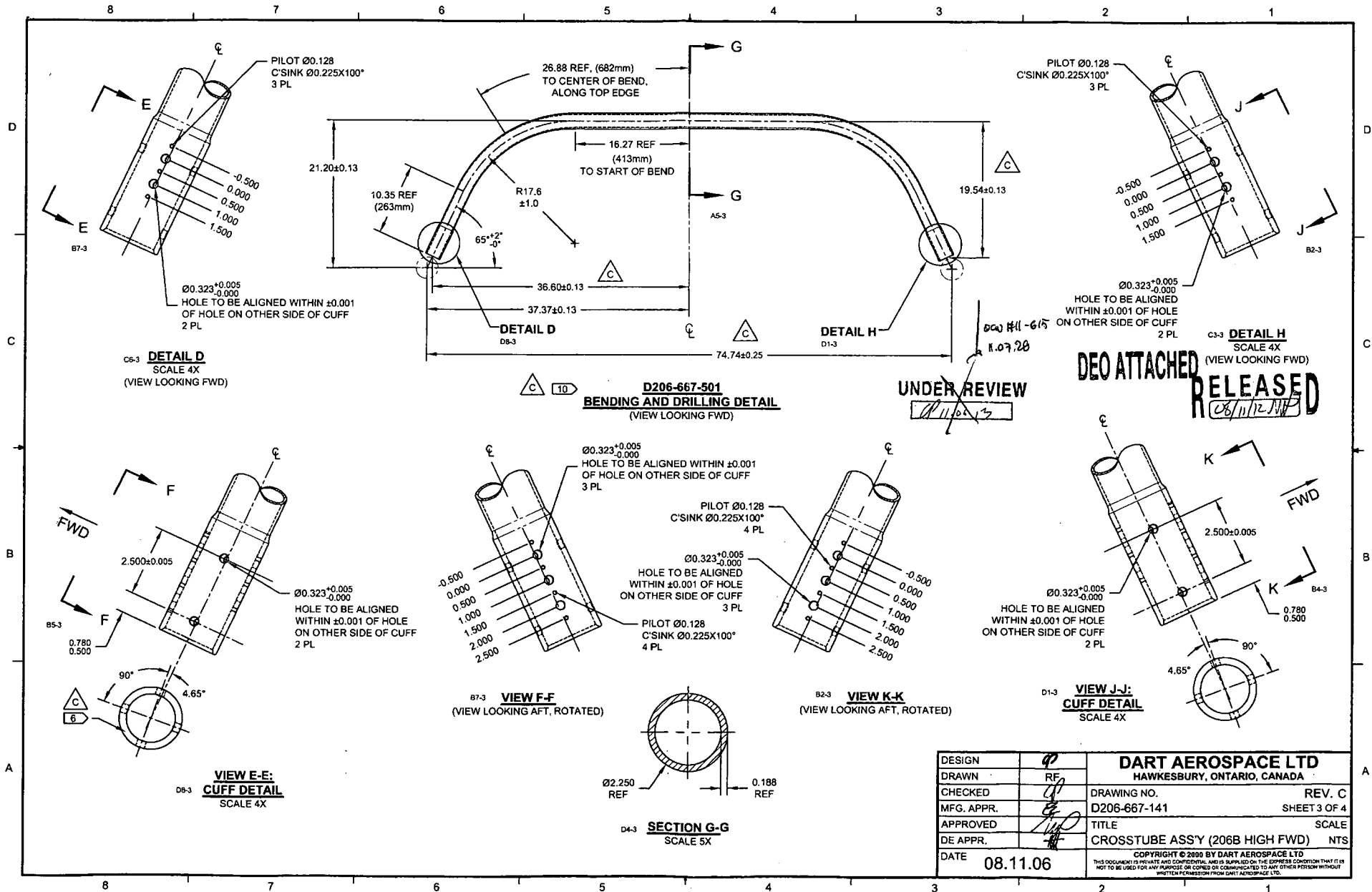
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78675



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

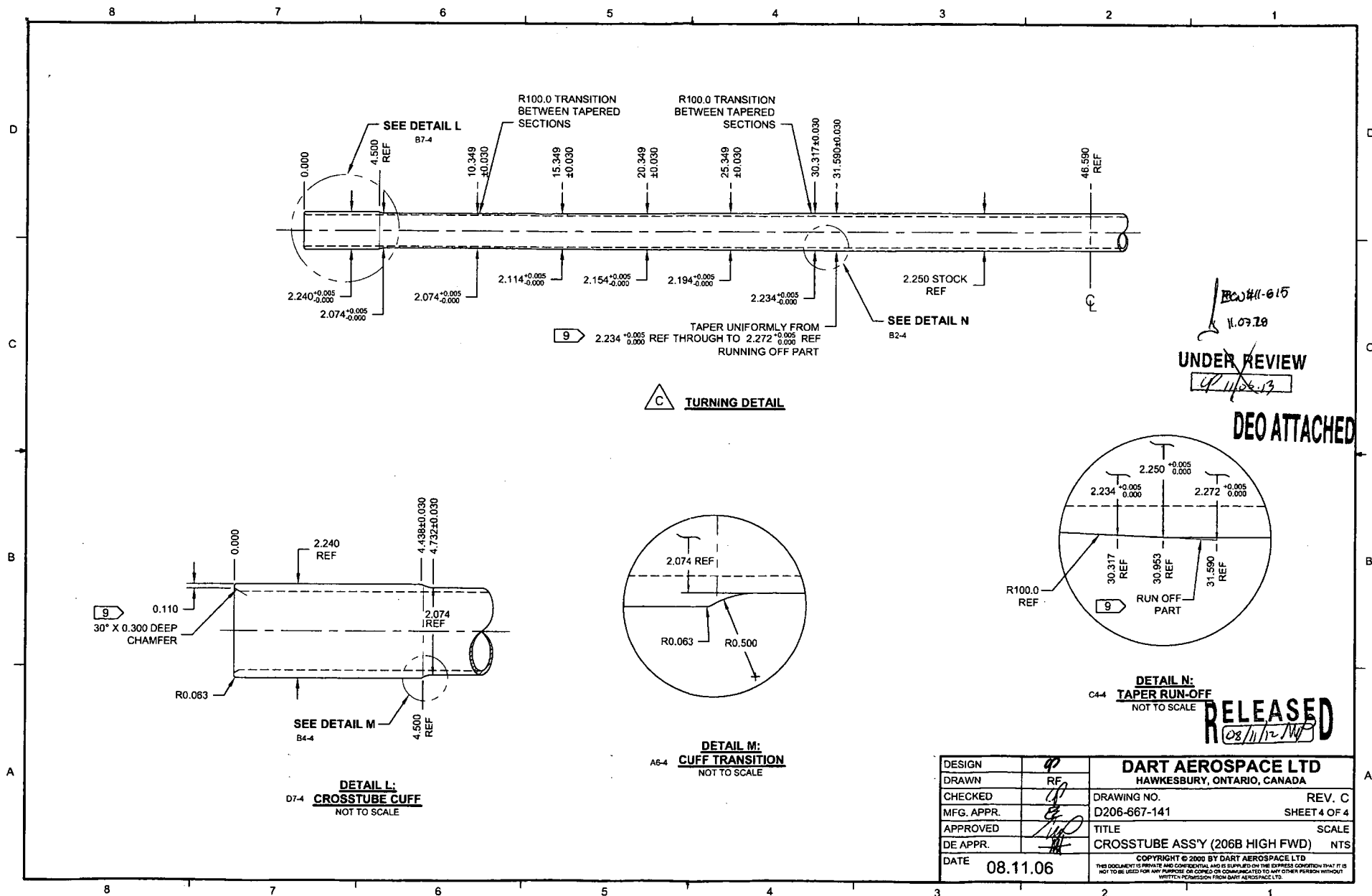
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78675



RCW#11-615
11.07.10
UNDER REVIEW
11/06/13

DEO ATTACHED

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

78675

DRAWING NO. D206-667-141	TITLE CROSSTUBE ASS'Y (206B HIGH FWD)	REV. C	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D206-667-141-C-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>MD</i>	APPROVED <i>MD</i>		DE APPR. <i>HA</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2891-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
MD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 12250

CLIENT	<u>DAT Aerospace</u>	DATE	<u>JAN 18 2012</u>	PAGE	<u>1</u> OF <u>1</u>
ATTENTION	<u>CHARTAL</u>	ACUREN JOB NO.	<u>128-12-C0010</u>	TIME	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>
ADDRESS	<u>1270 ABERDEEN ST.</u>	PO/VO No.	<u>15926</u>		
	<u>HAWKES BAY ONT.</u>	WORK LOCATION	<u>SAME</u>		
PROJECT	<u>F.P.E. on CROSS TUBES.</u>	ACCEPTANCE STD.	<u>ASTM 1417/QS1-08</u>	REV./DATE	<u>2005</u>
ITEM(S) EXAMINED	<u>(10) UNITS</u>				

JOB DESCRIPTION	PROCEDURE NO. <u>LT-0002</u>	REV./DATE	<u>2008</u>	TECHNIQUE NO. <u>LT-TECH2</u>	REV./DATE	<u>2008</u>
PART NO.	<u>SEE RESULTS</u>	MATERIAL	<u>ALUMINUM</u>	THICKNESS	<u>VARIABLE</u>	
SCOPE	<u>A WET FLUORESCENT LIQUID PENETRANT INSPECTION</u> <u>CARRIED OUT ON 100% EXTERNAL SURFACE</u>					

TEST DETAILS	
METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND <u>ZYLO-MAGNAFLUX</u>	BLACK LIGHT S/N <u>16459</u> <input checked="" type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT <u>ZL 67</u> MINIMUM DWELL TIME <u>45</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER <u>H2O</u> MINIMUM DRY TIME <u>>10</u> MIN.	OTHER <u>LABINO</u>
DEVELOPER <u>SK052</u> MINIMUM DWELL TIME <u>10</u> MIN.	LIGHT METER S/N <u>1098866</u> CAL DUE DATE <u>FEB 2</u>
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	<u>2012</u>

TEST SURFACE	
SURFACE CONDITION <input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input checked="" type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input checked="" type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE <input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F <input type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F	

RESULTS- <input checked="" type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL	
<u>1 - CROSS TUBE W.O. 78464</u> ✓ <u>1 - CROSS TUBE W.O. 78463</u> ✓ <u>1 - CROSS TUBE W.O. 75806</u> ✓ <u>1 - CROSS TUBE W.O. 75805</u> ✓ <u>1 - CROSS TUBE W.O. 78677</u> ✓ <u>1 - CROSS TUBE W.O. 78675</u> ✓ <u>1 - CROSS TUBE W.O. 78678</u> ✓ <u>1 - CROSS TUBE W.O. 78674</u> ✓ <u>1 - CROSS TUBE W.O. 78676</u> ✓ <u>1 - CROSS TUBE W.O. 78946</u> ✓ <u>206 447 20704</u>	<u>WAS REFOUND IN ONE AREA</u> <u>12-01-18</u>

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		DTR # <u>E-96923</u>
CLIENT REPRESENTATIVE <u>Andrew Sheldon</u>	<u>Sheldon</u>	REPORT REVIEWED BY:
TECHNICIAN (SIGNATURE): <u>M. J. Johnston</u>	<u>Johnston</u>	NAME INITIALS
NAME (PRINT): <u>M. J. Johnston</u>	<u>Johnston</u>	
CGSB LEVEL <u>II</u> SNT LEVEL <u>II</u>	CGSB LEVEL <u>II</u> SNT LEVEL <u>II</u>	
CGSB Reg. No. <u>6606</u>	CGSB Reg. No. <u>6606</u>	

WHITE - CLIENT COPY

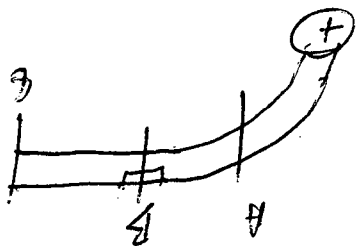
CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

Crushing of D206-667-101

Acceptability of 8% crushing



Point A: $OD = 2.238$ $OD = 1.96$

Crushing = $(2.238 - 1.96) / (2.238 + 1.96) \times 100 = 8\%$
 $I = 0.263$ in⁴ from AutoCAD

Point B: $OD = 2.250$ $OD = 1.874$
 $I = 0.653$ in⁴

A: $F = Mc/I = P \times 10.8 \times 1906 / 2 \times 0.263 = 39.13$ p
 $= P \times 24.7 \times 2350 / 2 \times 0.653 = 41.86$ p
 $MS = 41.86 / 39.13 - 1 = 0.06$

So the will break at support before area of 8% crushing - 8% crushing in area at end of bend is acceptable

Q. 2.2.2.1